

# Investigating Earth Systems Correlation for Hawaii

## Grade 8 Earth Systems/Environmental Science Content Standards (Domain II)

<b>Correlation Key:</b> <b>“X” Coverage</b> = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.  <b>“XX” In-depth Coverage</b> = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.		Climate and Weather	Dynamic Planet	Energy Resources	Fossils	Materials and Minerals	Oceans	Rocks and Landforms	Soil	Water as a Resource
<b>Standard 1 - UNDERSTANDING SCIENTIFIC INQUIRY AND THE CHARACTER OF SCIENTIFIC KNOWLEDGE: Students explain the process of how scientific knowledge</b>										
Benchmarks	Performance Indicators									
SCIENTIFIC INQUIRY	SCIENTIFIC INQUIRY									
<ul style="list-style-type: none"> <li>• Describe how scientific inquiry is a way of knowing.</li> </ul>	1. Describes how scientific inquiry is a way of knowing.	XX	XX	XX	XX	XX	XX	XX	XX	XX
<ul style="list-style-type: none"> <li>• Identify good scientific explanations and justify their soundness based on evidence, logical and consistent arguments, and use of scientific principles, models, or theory.</li> </ul>	2. Gives examples of how science advances through legitimate questioning.	XX	XX	XX	XX	XX	XX	XX	XX	XX
<ul style="list-style-type: none"> <li>• Give examples where scientists used mathematics and technology to gather, quantify, and analyze results of an investigation.</li> </ul>	3. Gives examples where scientists used mathematics and technology to gather, quantify, and analyze results of an investigation.	XX	XX	XX			X		X	X
	4. Gives examples where scientists use tools to increase their ability to observe, measure, and compare things more accurately.	XX	X	XX	X	X	X		X	X
	5. Gives examples of scientific advancements that have been the basis for new scientific knowledge and increased the ability to observe, measure, and compare things more accurately and precisely.	XX	X	XX	X		X			X

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SCIENTIFIC KNOWLEDGE	SCIENTIFIC KNOWLEDGE									
<ul style="list-style-type: none"> <li>Describe how scientists prove that their conclusions are valid.</li> </ul>	1. Analyzes or compares/contrasts examples of past “scientific” principles, models, and theories that have been modified as new information has emerged (e.g., heliocentric v. geocentric theory, formation/structure/organization of the universe).		XX				X			
	2. Analyzes a case study or a scientific investigation for the following criteria:	XX	XX	XX	XX	XX	XX	XX	XX	XX
	<ul style="list-style-type: none"> <li>Explanation must be logically consistent.</li> </ul>	XX	XX	XX	XX	XX	XX	XX	XX	XX
	<ul style="list-style-type: none"> <li>Must abide by the rules of evidence.</li> </ul>	XX	XX	XX	XX	XX	XX	XX	XX	XX
	<ul style="list-style-type: none"> <li>Must be open to questions and possible modification.</li> </ul>	XX	XX	XX	XX	XX	XX	XX	XX	XX
	<ul style="list-style-type: none"> <li>Must be based on historical and current scientific knowledge</li> </ul>	XX	XX	XX	XX	XX	XX	XX	XX	XX

**Standard 2 - INTERDEPENDENCE OF SCIENCE, TECHNOLOGY, AND SOCIETY: Students analyze and evaluate the interdependence of science, technology, and society.**

<b>Benchmarks</b>	<b>Performance Indicators</b>										
INTERDEPENDENCE OF SCIENCE, TECHNOLOGY AND SOCIETY	INTERDEPENDENCE OF SCIENCE, TECHNOLOGY AND SOCIETY										
Give an example of the interdependence of science, technology, and society and how it changed the course of history.	1. Traces the long term effects of a scientific discovery on society in the context of environmental or space science (e.g., ozone layer, air conditioning, asbestos, space shuttle, nuclear energy).	XX		XX		XX					XX
Give examples of societal influence on the development and use of technology and peoples’ response to these developments (e.g., development of dynamite).	2. Relates examples of ways in which social needs have influenced the direction of technology (satellites, cellular phones, e-mail).	XX		XX		XX	XX				XX
TECHNOLOGICAL IMPACTS	TECHNOLOGICAL IMPACTS										
Describe and exemplify how information and communication technologies affect research and work done in the field of science.	1. Identifies and describes current relevant examples of ways in which information/communication technology influences developments in science research (e.g., space research, Internet, GPS/Global Positioning System, infrared cameras).	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX

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**Standard 3 - “MALAMA I KA ‘AINA”: SUSTAINABILITY: Students make decisions needed to sustain life on Earth now and for future generations by considering the**

Benchmarks	Performance Indicators								
SUSTAINING FOOD SUPPLY	SUSTAINING FOOD SUPPLY								
<ul style="list-style-type: none"> <li>Give scientific inferences regarding environmental and societal issues stemming from agriculture and manufacturing technology.</li> </ul>	1. Investigates the agricultural and manufacturing practices in Hawaii and infers the benefits and consequences on the community and environment								
CONSERVATION OF RESOURCES	CONSERVATION OF RESOURCES								
<ul style="list-style-type: none"> <li>Explain how methods for obtaining and using resources such as water, minerals, and fossil fuel have consequences on the environment.</li> </ul>	1. Critiques the use of natural resources within the community, including the safeguards for the environmental impacts of energy conservation.			XX		X			XX
	2. Discusses present natural resource conservation practices and proposes additional practices relevant to the community.			XX		X			XX
	3. Analyzes various methods for obtaining water, minerals, and fossil fuels and their resulting consequences on the environment.			XX		XX			XX

**Standard 6 - CYCLE OF MATTER AND ENERGY FLOW: Students trace the cycling of matter and the flow of energy through systems of living things.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Explain how plants use the energy from sunlight and matter from the atmosphere to make food that can be used for fuel or building materials.</li> </ul>	1. Explains how all living things use food energy and matter from the atmosphere to provide energy for life.			X			X		
<ul style="list-style-type: none"> <li>Give examples of conservation of matter where matter is transferred within and among living organisms and their physical environment.</li> </ul>				X					

**Standard 7 - BIOLOGICAL EVOLUTION: Students examine evidence for the evolution of life on earth and assess the arguments for natural selection as a scientific**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Describe and explain how living things have changed over geologic time by using fossils and other evidence.</li> </ul>	1. Explains how the environment has changed and the effects of this change on living organisms.				XX				
<ul style="list-style-type: none"> <li>Explain how small differences between parents and offspring can accumulate in successive generations so those descendants are different from their ancestors.</li> </ul>					XX				
<ul style="list-style-type: none"> <li>Relate how changes in the environment can affect the survival of individual organisms and entire species.</li> </ul>					XX				

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**Standard 13 - NATURE OF MATTER: Students examine the nature of matter.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Compare and contrast the physical and chemical properties of specific substances (e.g., by growing crystals of common salts and sugars).</li> </ul>	1. Explains the chemical composition of entities within galaxies and solar systems (e.g., stars, planets).								
<ul style="list-style-type: none"> <li>Explain common chemical reactions (e.g., electrolysis, replacement in acid/base reactions, oxidation).</li> </ul>	2. Describe the origin/composition of soils in various areas of Hawaii.							X	

**Standard 14 - ENERGY, ITS TRANSFORMATION AND MATTER: Students identify the different forms of energy and explain transformation of energy and its significance**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Describe and explain an example of energy transfer and transformation.</li> </ul>	1. Identifies earthquake waves as similar to sound waves.		X						
<ul style="list-style-type: none"> <li>Demonstrate how vibration in materials set up wavelike disturbances that spread away from the source.</li> </ul>			X						
<ul style="list-style-type: none"> <li>Compare and contrast forms and behavior of various types of energy.</li> </ul>			X	XX					
<ul style="list-style-type: none"> <li>Describe and analyze examples of conservation of energy.</li> </ul>				X					

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**Standard 15 - FORCES, MOTION, SOUND, AND LIGHT: Students explain the relationship between force, mass and motion of objects; they analyze the nature of sound and**

Benchmarks	Performance Indicators								
MOTION AND FORCES	MOTION AND FORCES								
<ul style="list-style-type: none"> <li>Explain the interaction between force and matter and the relationships among force, mass and motion.</li> </ul>	1. Applies Newton’s laws of motion to the movement of objects in space.								
ELECTROMAGNETIC RADIATION	ELECTROMAGNETIC RADIATION								
<ul style="list-style-type: none"> <li>Explain that light from the sun is made up of a mixture of many different colors.</li> </ul>	1. Explains the use of different wavelengths in collecting information from objects in space.								
<ul style="list-style-type: none"> <li>Explain how we detect and differentiate the range of energy in the electromagnetic spectrum.</li> </ul>	2. Explains the relationship of star color with temperature and age.								

**Standard 16 - UNIVERSE: Students discuss current scientific views of the Universe.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Give examples of objects in the solar system that <i>is</i> in regular and predictable motion.</li> </ul>	1. Collects, records, and organizes data of objects in the solar system that are regular and predictable in motion.	X							
<ul style="list-style-type: none"> <li>Describe what constitutes the universe.</li> </ul>	2. Compares and contrasts the prevalent theories toward the creation of the Universe.								
<ul style="list-style-type: none"> <li>Describe how a telescope works and the optimal conditions for its use on Earth.</li> </ul>	3. Compare and contrasts the characteristics of celestial bodies (e.g., stars, planets, satellites) in our solar system.								
	4. Explains astronomical phenomena including nebulae, black holes, eclipses, sunspots, pulsars, novas, and quasars.								
	5. Describes the life cycle and characteristics of a star.								
	6. Collects data and presents information on various types and functions of telescopes and the optimal conditions for their use.								

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**Standard 17 - FORCES OF THE UNIVERSE: Students explain the major forces in nature: gravitational, electrical and magnetic.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Build a model that illustrates that every object exerts a gravitational force on every other object.</li> </ul>	1. Illustrates and explains the role gravity and inertia play in planetary and Earth systems.								
<ul style="list-style-type: none"> <li>Illustrate and explain what holds the Earth and other planets in their orbits and keeps their moons in orbit around them.</li> </ul>	2. Demonstrates that Kepler’s laws can be used to predict the positions of planets.								
<ul style="list-style-type: none"> <li>Explain how electric currents and magnets exert a force on each other.</li> </ul>	3. Demonstrate and elaborates on the relationship between electrical currents and magnets.			X					

**Standard 18 - EARTH IN THE SOLAR SYSTEM: Students discuss how the Earth-moon-Sun system causes seasons, moon phases, climate, weather and global changes.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Describe how the Earth’s motions and tilt on its axis lead to changes in seasons.</li> </ul>	1. Diagrams and explains the Earth’s rotation and revolution around the Sun.	X							
<ul style="list-style-type: none"> <li>Explain the role of the sun as the major source of energy for plant growth, weather systems, ocean currents, and the water cycle.</li> </ul>	1. Demonstrates the cause and effect relationship between the Earth’s rotation/tilt of its axis and the change in seasons.								
	2. Explains the role of the Sun’s heating of the Earth to weather systems, the water cycle, and ocean currents.	XX				XX			
	3. Relates convection currents in the atmosphere to plate movement.	XX	XX			XX			
	4. Explains the causes of tides and <u>waves</u> in the ocean.					XX			
	5. Demonstrates the relationship between temperature and pressure within air and water masses.	XX				XX			
	6. Explains how the sun affects life on Earth.			X		X			

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**Standard 19 - FORCES THAT SHAPE THE EARTH: Students analyze the scientific view of how the Earth’s surface is formed.**

Benchmarks	Performance Indicators								
<ul style="list-style-type: none"> <li>Compare land and ocean topographic features and geologic history. (New benchmark.)</li> </ul>	1. Defines and describes oceans in terms of size, depth, and geologic history.						XX		
<ul style="list-style-type: none"> <li>Describe how different kinds of rocks are formed.</li> </ul>	2. Identify the features of ocean bottom and the geologic results of these features.						XX		
<ul style="list-style-type: none"> <li>Compare different kinds of soil and their formation.</li> </ul>	3. Defines and describes the theories of continental drift and plate tectonics and identify supporting evidence (e.g., fossils, rock composition).		XX				XX		
	4. Diagrams surface and deep ocean currents and explain their origin.						XX		
	5. Records the characteristics of igneous, metamorphic, sedimentary rocks and gives examples of these three main types of rocks.							XX	
	6. Illustrates a model of the rock cycle, which exhibits the interrelationships of how the three main types of rocks are formed.							XX	
	7. Describes the processes that can lead to soil formation.								XX
	8. Compares properties of different soil types and their formation (e.g., loam and humus).								XX